3. The substrate processing system of claim 11 further comprising a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma.

4. The substrate processing system of claim 3 further comprising a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

5. The substrate processing system of claim 3 further comprising a pressure control system configured to control a pressure level within said chamber and controllably coupled to said processor wherein said processor controls said pressure control system to vary the pressure within the chamber in response to the measured impedance level of said plasma.

6. The substrate processing system of claim 3 wherein said processor controls said plasma power source to vary the power applied to the plasma in response to the measured impedance level of said plasma.

7. RESTRICTION REQUIREMENT.

8. RESTRICTION REQUIREMENT.

9. RESTRICTION REQUIREMENT.

10. RESTRICTION REQUIREMENT.

11. A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power

supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor comprising a first impedance probe electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to said low frequency electrode to measure the impedance at the LF electrode; and

a processor coupled with the impedance monitor for adjusting processing conditions of the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

12. The substrate processing system of claim 11 further comprising a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

13. The substrate processing system of claim 11 further comprising an impedance tuner coupled in series to said pedestal.

14. The substrate processing system of claim 13 wherein said impedance tuner is coupled between said pedestal and a low frequency RF generator.

15. PREVIOUSLY CANCELED.

16. A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power

supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode;

a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma;

a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network electrically coupled to a high frequency RF generator and said gas manifold, wherein said matching network has capacitors that are different than said variable capacitor.

17. CANCELED.

18. CANCELED.

19. The substrate processing system of claim 14, wherein said impedance tuner includes a variable capacitor.

20. A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode, said impedance monitor including an impedance monitor variable capacitor;

a processor communicatively coupled to said impedance monitor for receiving as an input a measured impedance level of said plasma;

a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled between a low frequency RF generator and said variable capacitor, wherein said matching network includes capacitors that are different than said variable capacitor.

21. The substrate processing system of claim 11, further comprising a high frequency power supply coupled to said high frequency electrode and a low frequency power supply coupled to said low frequency electrode.

22. PREVIOUSLY CANCELED.

23. The substrate processing system of claim 4 further comprising an RF matching network electrically coupled to the chamber, and wherein the variable capacitor is separate from the matching network.

24. The substrate processing system of claim 16 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

25. PREVIOUSLY CANCELED.

26. The substrate processing system of claim 20 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

27. The substrate processing system of claim 11 wherein the processor is configured to adjust a pressure in the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

28. The substrate processing system of claim 11 wherein the processor is configured to adjust at least one of a high frequency RF power level of the power source and a low frequency RF power level of the power source, based on measurements by the first impedance probe and the second impedance probe.

29. The substrate processing system of claim 13 wherein the processor is configured to adjust a setting of the impedance tuner based on measurements by the first impedance probe and the second impedance probe.

30. The substrate processing system of claim 24 wherein the computer processor is configured to adjust a pressure in the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

REMARKS

Claims 3-6, 11-14, 16, 19-21, 23, 24, and 26-30 are pending. Claims 11, 16, and 20 have been amended to correct minor informalities. No new matter has been introduced, and no new issue has been raised. Applicants believe the claims comply with 35 U.S.C. § 112.

Claims 3, 4, 6, 11-14, 16, 19-21, 23, 24, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohmi in view of Patrick et al. Claims 5, and 27-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohmi in view of Patrick et al., and further in view of Boys et al.

I. Rebuttal to Examiner's "Response to Arguments"

In the "Responses to Arguments," the Examiner makes a number of assertions. They are each addressed below.

A. Patrick et al. Does Not Disclose the Use of Both HF and LF Electrodes

The claims recite two electrodes: a low frequency (LF) electrode and a high frequency (HF) electrode. The Examiner maintains in ¶ 7 of the Office Action that Patrick et al. discloses the use of both high frequency (HF) RF energy and low frequency